

What is claimed is:

1. A housing comprising:
an optically transparent volume having a first refractive index;
an optical entry point defined on the surface of the optically transparent volume;
an optical transit point defined within the optically transparent volume;
and
a first pocket formed in the optically transparent volume;
wherein the first pocket defines a first three-dimensional negative object within the optically transparent volume having a second refractive index substantially less than the first refractive index;
wherein the first pocket is substantially encased by the optically transparent volume; and
wherein the first pocket is shaped to reflect a beam of light passing through the optical entry point and incident upon the first pocket to the optical transit point.
2. The housing of claim 1 wherein the first pocket is filled with a gas.
3. The housing of claim 2 wherein the gas is air.
4. The housing of claim 1 wherein the refractive index of the first pocket is substantially unity.

5. The housing of claim 1 wherein the first pocket encloses a partial vacuum.
6. The housing of claim 1 further comprising:
 - a second pocket formed in the optically transparent volume; and
 - an optical exit point defined within the optically transparent volume;
 - wherein the second pocket defines a second three-dimensional negative object within the optically transparent volume having a third refractive index substantially less than the first refractive index;
 - wherein the second pocket is substantially encapsulated by the optically transparent volume; and
 - wherein the second pocket is shaped to reflect a beam of light from the first pocket passing through the optical transit point and incident upon the second pocket to the optical exit point.
7. The housing of claim 6 wherein the first and second pockets are filled with air.
8. The housing of claim 6 wherein the first and second refractive indices are substantially unity.
9. The housing of claim 6 further comprising a hollow recess positioned between the optical transit point and the optical exit point.

10. The housing of claim 9 further comprising an optical device and wherein at least a portion of the optical device is positioned within the hollow recess.

11. The housing of claim 10 wherein the optical device is a rotary encoder.

12. The housing of claim 10 wherein the optical device is part of an automotive clockspring.

13. A combination, comprising:
a substantially solid transparent body having a first refractive index;
a first cavity formed within the substantially solid transparent body; and
a first optical medium substantially filling the first cavity;
wherein the first optical medium is having a second refractive index substantially less than the first refractive index; and
wherein the first cavity is adapted to redirect incident light shining through the substantially solid transparent body through a first predetermined angle.

14. The combination of claim 13 further comprising a light source positioned to shine a beam of light through the substantially solid transparent body to the first cavity.

15. The combination of claim 13 further comprising a second cavity formed within the substantially solid transparent body; and

a second optical medium substantially filling the second cavity;

wherein the second optical medium has a third refractive index substantially less than the first refractive index; and

wherein the second cavity is adapted to redirect incident light shining from the first cavity through the substantially solid transparent body through a second predetermined angle.

16. The combination of claim 15 further comprising:

a light source positioned to shine a beam of light through the substantially solid transparent body to the first cavity; and

a recess formed in the substantially solid transparent body;

wherein the recess is positioned such that light redirected from the second cavity shines through the recess.

17. The combination of claim 16 further comprising an optical device positioned in the recess.

18. The combination of claim 17 wherein the optical device includes an encoder wheel adapted to periodically transmit a light beam therethrough and a photodetector positioned to detect the periodic transmission of a light beam through the encoder wheel.

19. A light pipe, comprising:

a transparent member having a first refractive index;

a light source positioned to shine a light beam through the transparent member; and

at least one enclosed pocket positioned within the transparent member;

wherein the at least one enclosed pocket has a second refractive index;

wherein the first refractive index is substantially greater than the second refractive index; and

wherein light shining through the transparent member is totally internally reflected by the at least one enclosed pocket.